

14A

Notice of Allowability

Application No.

10/709,699

Examiner

Thao P. Le

Applicant(s)

CHENG ET AL.

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/14/05.
2. ☒ The allowed claim(s) is/are 17-36.
3. ☒ The drawings filed on 24 May 2004 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>5/24/04</u> | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

Thao P. Le
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DETAILED ACTION

Election/Restriction

1. Examiner confirms that Applicants elected to prosecute group I (previously presented claims 17-20 and newly added claims 21-36) and have canceled group II (claims 1-16) without prejudice.

2. The Amendment filed on 03/14/05 has been entered.

The specification has been amended.

Claims 1-16 have been canceled.

Claim 17 has been amended.

Claims 21-36 have been newly added.

Information Disclosure Statement

3. Information Disclosure Statement (IDS) filed on **05/24/04** and made of record.

The references cited on the PTOL 1449 form have been considered.

EXAMINER'S AMENDMENT

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

5. Authorization for this examiner's amendment was given in a telephone interview with Attorney Graham S. Jones, II (Tel. 845-473-9118) on 03/23/05. The Application has been amended as follows:

a) Amend the specification, paragraph 0146, line 5, replace "same as in FIGS. 4A-4GE" by

--- same as in FIGS. 4A-4G ----

b) Replace claim 17 as following:

17. A semiconductor device on a semiconductor substrate, comprising:

an array of parallel trenches formed on the semiconductor substrate
comprising alternating wide trenches and narrow trenches;

a plurality of first electrodes formed in the narrow trenches composed of a first fill material of a first conductivity type;

a plurality of second electrodes formed in the wide trenches composed of a second fill material of an opposite conductivity type;

a first set of outdiffusion regions doped with dopant diffused from the first electrode into a region in the substrate about the periphery of the corresponding narrow trench; and

a second set of outdiffusion regions doped with dopant diffused from the second electrode into a region in the substrate about the periphery of the corresponding wide trench.

c) Amend claim 30 as following:

Add "29" after "claim", before "including", ---- the photodetector device of claim 29 including----

d) Amend claim 35 as following:

In line 10, replace "diffused from a first electrode" by --- diffused from the first electrode ---

In line 12, replace "diffused from a second electrode" by --- diffused from the second electrode ---

Reasons for Indication of Allowable Subject Matter

6. Claims 17-36 are allowed.

The following is a statement of reason for the indication of allowable subject matter:

a) A set of claims 17-28 and 35-36:

Claims 17-28 and 35-36 are considered allowable since none of the prior art made of record and considered pertinent to the applicant's disclosure teach or suggest the claimed limitations having a semiconductor device on a semiconductor substrate comprising an array of parallel trenches formed in the substrate comprising alternating wide trenches and narrow trenches and among other features cited in independent claims 17 and 35.

b) A set of claims 29-34:

Claims 29-34 are considered allowable since none of the prior art made of record and considered pertinent to the applicant's disclosure teach or suggest the claimed limitations having a photodetector device formed on a semiconductor substrate comprising a wide trench and a narrow trench formed in the substrate, a first electrode formed in the narrow trench of a deposit of a first fill material filling the wide trench partially and filling the narrow trench completely, an epitaxial semiconductor layer formed in the wide trench leaving a narrowed wide trench therein and then a second electrode formed in the wide trench by a second fill material and among other features cited in independent claim 29.

7. If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thao P. Le', with a stylized, cursive script.

Thao P. Le
Examiner
Art Unit 2818
March 24, 2005.